N. E. R. T.

Nurturing ECSU Research Talent

Office of Naval Research

Research Team Descriptions

1996 - 1997

This program, entitled "Nurturing ECSU Research Talent focuses on undergraduate education and undergraduate research experiences. Nurturing these young researchers is our primary concern. Highest priority is given to providing them with the guidance and skills to insure their entrance and success in graduate school. Further, each student in our program learns the fundamentals of scientific research. Program activities are as follows:

I. Student development activities:
   a) Recruitment of 5 high ability minority students each year.
   b) Providing a precollege/summer experience for recruited students.
   c) Providing research experiences;
   d) Providing a mentor, graduate school counseling and GRE preparation.
   e) Providing financial support for students in the form of research scholarships.
   f) Providing funds for student travel.

2. Infrastructure activities
   a) Enhancement of current computer graphics and operating systems courses.
   b) Development of a new course in computer visualization.
   c) Establishing a visiting lecture series in computer science.
   d) Hiring a UNIX network manager.
   e) Acquisition of computer equipment appropriate to support research training activities.

1996-97 Research Teams

Research Focus	Mentor	Team Members (24)
Fractals/Chaos	Dr. D. Sengupta	Donald Charity, Fr/Math Cory Ellis, Jr/Applied Math Brian Jordan, Sr/Applied Math Ayonda Moore, Jr/Math
Visualization	Dr. K. Edoh	Lakisha Mundon, So/Math Felica Bowser, Sr/CS LaVerne Williams, Jr/CS Tanisha Cowell, Jr/CS
HTML/JAVA	Mrs. T. Chamberlain Dr. L. Hayden	Courtney Fields, So/CS Reginald Turner, Sr/CS Kuchumbi Hayden, So/CS Katrina Godwin, Fr/CS Shakiya Rodgers, Fr/CS
ATM Networks	Mr. D. Archer Dr. L. Hayden	Curtis Felton, Jr/CS Derrek Burrus, So/CS Antonio Rook, So/CS Fred Sessoms, Jr/CS Stacia McFadden, Sr/CS Charles Gatling, Jr/CS Melvin Anderson, Jr/CS Jamal Turner, Jr/Ind Tech
Statistical Analysis	Dr. M. Mannan	Arthur Fenner, Jr/Math Tamara McCray, Jr/Math Toinette Jenkins, Fr/CS

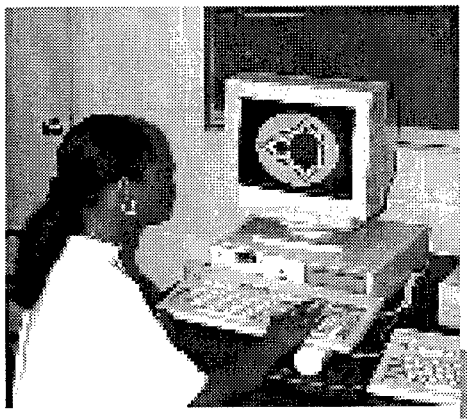
Fractals and Chaos

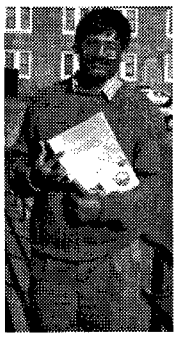
Most naturally occuring processes are inherently nonlinear and can give rise to very complex behaviors. Even very simple mathematical models can exhibit behavior that give rise to extremely convoluted (and often very beautiful) fractal shapes. The discovery of this fundamentally new area of mathematics has been crucially dependent on computational intensive graphic methods and has given birth to a radically new paradigm for mathematical research: experimental research.

In this project we will perform experimental mathematical investigation. The mathematical contents will comprisefractals, nonlinear dynamics and mathematical chaos.

We will study the orbits of a family of quadratic dynamical systems and investigate the period doubling route to chaos. We will design and develop mathematical materials and Mathematica programs necessary to do the investigation.

We will apply fundamental mathematical concepts to a wide variety of physical, biological and social processes (e.g., population growth, measles problem, growth of plant, problems of epidemiology, and the economics of arms race). The deep connection between geometry and nonlinear dynmaics will be explored and computer programs will be developed to generate fractal maps and pictures of compelling beauty. Finally, through guided work in experimental mathematics students will acquire a deeper understanding of mathematical and scientific thinking.





Dr. D. Sengupta
Team Mentor

Fractals/Chaos Team Members

Computer Visualization Team

The focus of the computer visualization research is use of data explorer visualization software running on a silicone graphics workstation. Students run visualizations on NASA and chemistry data sets. Visiting Lecture will be presented by Sharon Ramsey, visualization specialist from Alcoa Aluminum Co. Review of the literature will include chapters from Animation and Scientific Visualization: Tools & Applications, Edited by R A Earnshaw and D. Watson, Academic Press, 1993. ISBN 0-12-227745-7. References will also include Communications o the ACM Dec'94, vol. 37, no 12 p 29-102.

Dr. K. Edoh
Team Mentor

HTML/JAVA Team

Student HTML/JAVA researchers learn to produce documents in Hypertext Markup Language (HTML), the language used on the World Wide Web to create web pages. The web pages include: backgrounds, images, animated GIF images, tables, frames, JAVA applets, and shockwave technology.

Researchers are responsible for maintaining and updating the ONR/NERT web pages. Students also setup and maintain a http server for the ECSU homepage and are responsible for updating and maintaining all web pages for the university's homepage. They assist students, staff, and faculty in the scanning of logos and photos to be incorporated into web pages.

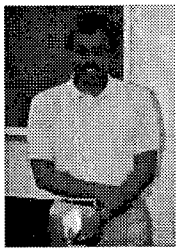
Statistical Analysis Team

The statistics team is responsible for the development of data concluded from research trips, meetings and other various seminars and lectuers. Our mission is to transform numerical data (appearing in the forms of various charts, graphs, and numbers), and transforming that data into a readable form.

The team gathered data from the 27th SIGCSE Technical Symposium and the Dr. C. D. Turnage Science, Math, Technology Scholars Program for Girls. The three steps that will be taken to achieve this goal are as follows: obtaining the data, converting the data, presentation of the data.

Arthur Fenner

Toinette Jenkins



Dr. Mannan
Team Mentor

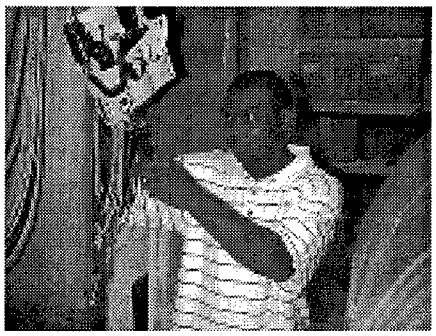
Tammara McCray

Charles Gatling

Fred Sessoms

ATM Networks

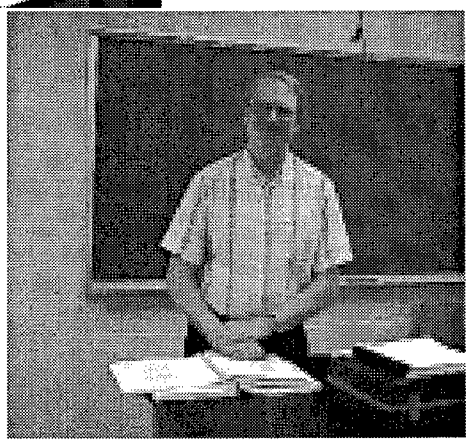
The focus of the Networking Research in on Issues, challenges and Installation of **A**synchronous **T**ansfer **M**ode (**ATM**) networks in 115 Lester Hall and the conversion of the campus backbone to ATM. Student researchers get hands on experience while assisting with the installation of ATM Network to the desktop in Lester Hall and conversion of the campus backbone. Visiting Lecture have been presented by ADNET Systems, Inc, Jerry Trott, UNC-GA System Administrator, and Sunsil Punoose. Review of the literature will include articles from the Communications of the ACM, Feb. 1995, Vol. 38, no. 2, p 28-109.



Parallel Processing Team

Two sorting algorithms were chosen for the team to work on, Quicksort and Radix Sort. These sorting algorithms were then converted into a parallel computer programming language code known as C-Linda which is based on the C programming language. This was done so that the sorting algorithms could be passed over the Ethernet and ATM protocols.

Dr. J. Houston
Faculty Mentor



Dr. Larry Morrell
Faculty Mentor

Visiting Lectures

Dr. K. C. Wong
Professor of Computer Science, Fayetteville State University

Dr. Andrea Lawrence
Chair Computer Science, Spelman University,

Mr. Stefan Lawrence
Numerical Analysis, Virginia State University

Dr. Larry Morell
Professor of Computer Science, Hampton University.

Dr. Gregory Cutter
Professor of Ocean Science, Old Dominion University

Dr. Lawrence Rosenblum
Director of VR Systems and Research of ONR

Dr. Fern Hunt
National Institute of Standards and Technology

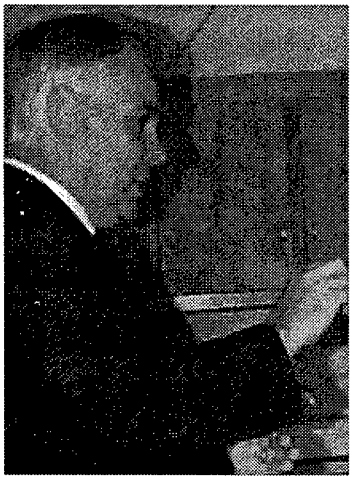
Dr. Mary Ellis
Professor of Computer Science, Hampton University

Mrs. Sharon Ramsey
Computer Visualization Specialist Alcoa Aluminum

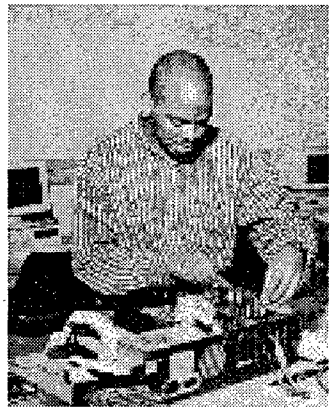
Dr. John Alexander
Head of the National Association of Mathematicians

Dr. William Hawkins
National Council of Teachers of Mathematics

Visiting Lectures



Dr. William Youngblood, representative of the North Carolina Supercomputing Center.

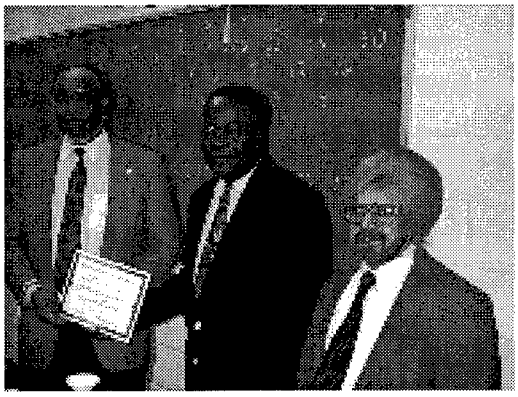


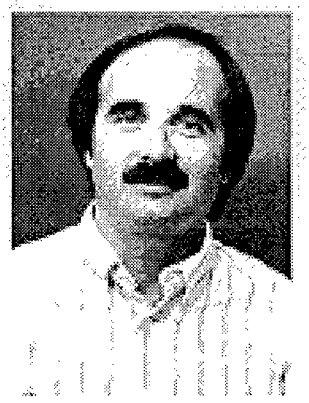
Mr. Stefan Lawrence, Virginia State University.

Representatives of UNC-Chapel Hill (Carolyn McMillian & Paul Hecki) inform student researchers about graduate school opportunities and summer research programs.

Visiting Lectures

Dr. John Alexander,
Dr. Johnny Houston,
CS Coordinator
Dr. Sohindar Sachdev,
Department Chair





Dr. Gregory Cutter

Dr. Fern Hunt

NERT Highlights

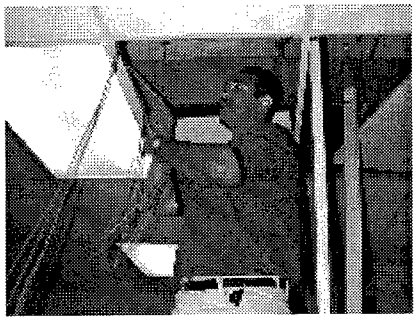
Certificate of Appreciation presented by HTML/JAVA student researchers to Dr. Hayden.

Dr. Rosenblum talks with ONR Virtual Reality Lab interns Felicia Bowser and Stacia McFadden.

Networking Staff

Darnley Archer
Network Manager

Wayman White
Asst. Network Manager

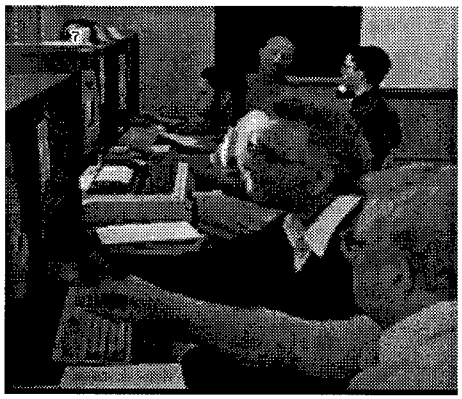


Kurt Roberson
Network Engineer

NERT Program Highlights

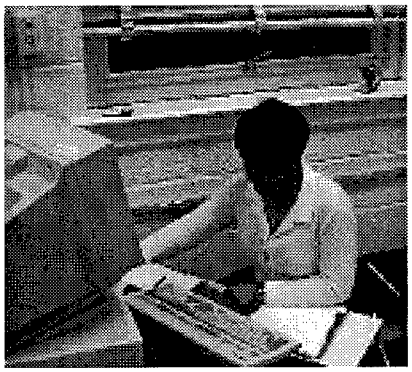
Apple Computers Engineers

Mentors: Drs. Sengupta, Zhang, Hayden, Choudhary



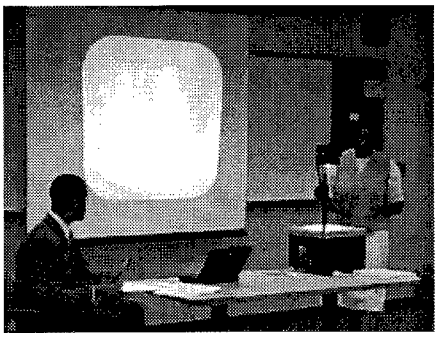
MATHEMATICA Training
by Wolfram

"Graduate Success" Highlights



Stacia McFadden, 1997 National Consortium for Graduate Degrees for Minorities in Engineering and Science Inc. (GEM) Fellowship Awardee.

Dr. Rosenblum with Chonda Gayle, Marie Dail and Sharon Saunders. All three are now CS graduate students.



Cutilda Monk (standing) Graduate student in Mathematics- Fayetteville State University with Corey Ellis 1996 NASA LARSS Intern.

Clarence Jones, Fellowship in Physics to Hampton University. with Eva Dail, Graduate Student in Computer Science- Hampton Univ.

NERT Program Highlights
The Graduate Experience

This lecture was given by ECSU graduates. They discussed their experiences while attending graduate school.

Michelle Brown '94 and Stephanie Vaughan '94

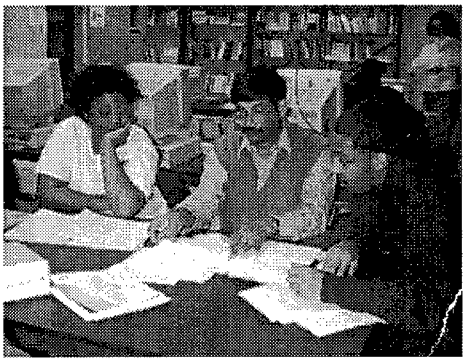
Michael Fields '96

Chonda Gayle '96

Timothy McCray '96

NERT Program Highlights

Curtis Felton, North Carolina Academy of Science Yarbrough Award Winner.



Research team at work

Honors and Awards Day

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13. ABSTRACT (Maximum 200 words)

This report documents the Nurturing ECSU REsearch Talent Research Team description for 1996-97. Report contains names of the student researchers and team mentors for the following teams which include, Fractals/Chaos, Visualization, HTML/JAVA, ATM Networks, and Statistical Analysis. The report also documents the visiting lectures for the 1996-97 program. Student travel and conference experience can be found in the report also.

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